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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/565,107	03/05/2007	Young-Man Jeong	0630-2627PUS1	5526
2292 7590 07/11/2008 BIRCH STEWART KOLASCH & BIRCH PO BOX 747 FALLS CHURCH, VA 22040-0747			EXAMINER CHEN, KEATH T	
			ART UNIT 1792	PAPER NUMBER
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/565,107	<b>Applicant(s)</b> JEONG ET AL.	
	<b>Examiner</b> Keath T. Chen	<b>Art Unit</b> 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 19 January 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>01/19/2006, 10/12/2007</u> .                                  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

1. Claim 19-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 19 recites the limitation "the carrier gas". There is insufficient antecedent basis for this limitation in the claim.

Claim 20 recites the limitation "the reservoir". There is insufficient antecedent basis for this limitation in the claim.

Claims 19 and 20 will be examined as "The system of claim 2 ...".

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. **Claims 1, 16-18, and 22 are rejected under 35 U.S.C. 102(b) as being anticipated by Hayakawa et al. (US 5580822, hereafter '822).**

'822 teaches all limitations of:

Claim 1: A plasma surface processing system (Fig. 5) for processing a surface of a metal material by forming plasma (col. 7, lines 66-67) in a reaction chamber (#115,

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col. 7, line 47), the system comprising a supply device (thermostatic chamber #108, col. 7, lines 27-28) for plasma processing solution (#101, col. 7, lines 2-3) which supplies a processing material which forms plasma into the reaction chamber as a liquid drop form (col. 9, lines 55-57, when operated at lower than 40°C) in order to process the surface of the metal material.

Applicant's claim requirements "metal material" are considered intended use in the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (*Walter*, 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (*In re Casey*, 152 USPQ 235 (CCPA 1967); *In re Otto*, 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02). When the structure recited in the reference is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent (*In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977); MPEP 2112.01).

Claim 16: The system of claim 1, wherein the surface of the metal material is consecutively processed (the apparatus is capable of).

Applicant's claim requirement "consecutively processed " is considered intended use in the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit

the scope of a claim (*Walter*, 618 F.2d at 769, 205 USPQ at 409; MPEP 2106).

Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (*In re Casey*, 152 USPQ 235 (CCPA 1967); *In re Otto*, 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02). When the structure recited in the reference is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent (*In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977); MPEP 2112.01).

Claim 17: The system of claim 1, wherein the metal material is an electrode (when substrate #111 is not present, the vapor deposits on electrode directly).

Claim 18: The system of claim 1, wherein the processing solution is hexamethyldisilazane (HDMS) or hexamethyldisiloxane (HDMSO).

Applicant's claim requirement " hexamethyldisilazane (HDMS) or hexamethyldisiloxane (HDMSO)" is considered intended use in the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (*Walter*, 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (*In re Casey*, 152 USPQ 235 (CCPA 1967); *In re Otto*, 136 USPQ 458, 459 (CCPA

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1963); MPEP2111.02). When the structure recited in the reference is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent (*In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977); MPEP 2112.01).

Claim 22: In a plasma surface processing system (Fig. 5) for processing a surface of a metal material by forming plasma in a reaction chamber, a supply device (#108) for plasma processing solution (#101) which supplies a processing material which forms plasma into the reaction chamber (#115) as a liquid drop form (col. 9, lines 55-57, when operated at lower than 40°C) in order to process the surface of the metal material.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

**3. Claims 2, 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over '822, in view of Kutsunai et al. (US 20010028074, hereafter '074).**

'822 teaches all limitations of claim 1, as discussed above. '822 further teaches the limitations of:

Claim 2: The system of claim 1, wherein the supply device (thermostatic chamber #108, col. 7, lines 27-28) for plasma processing solution (#101) comprises: a processing solution reservoir (#102 and #118, col. 7, line 20 and 25) for storing plasma processing solution (#101) as a hermetic state (col. 7, lines 21-23, vacuum requires seal); and a supply pipe (pipe near MFC #103) installed by connecting the reservoir (#102 and #118) and the reaction chamber (#115).

Claim 20: The system of claim 2 (1), wherein the reservoir (#102 and #118) further comprises a processing solution supplementary device (container #118 col. 7, line 25) for supplementing plasma processing solution thereinto.

Claim 21: The system of claim 20, wherein the processing solution supplementary device (#118) comprises: a first supplementary pipe (pipe between #117 and #102) connected to the reservoir (#102); a storage container (#118 is a container) in which processing solution (#101) is stored; a second supplementary pipe (pipe between #118 and #117) connected to the storage container (#118); a connecting unit (pipe line intrinsically having many connecting units, for example, the connection between pipe and valve) for connecting the first supplementary pipe and the second supplementary pipe; and a valve (#117).

'822 does not teach the limitations of:

Claim 2: a carrier gas inflow pipe connected to the reservoir and for introducing carrier gas which carries liquid drops of the plasma processing solution; (the supply pipe) in order to supply the carrier gas including liquid drops of the plasma processing solution into the reaction chamber.

Claim 19: The system of claim 2 (1), wherein the carrier gas is N<sub>2</sub> or He.

Claim 21: valves respectively installed at the first and second supplementary pipes.

'074 is an analogous art in the field of CVD (abstract; similar to '822, field of the invention), particularly in supplying precursor mist ([0077]; similar to '822 precursor liquid droplet, col. 9, lines 55-57). '074 teaches the use of carrier gas N<sub>2</sub> ([0186], Fig. 10) to carrier liquid drops (mist, [0077]) to supply to the reaction chamber.

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to have added the N<sub>2</sub> carrier gas to the apparatus in Fig. 5 of '822.

The motivation to add carrier gas is suitability. The selection of something based on its known suitability for its intended use has been held to support a *prima facie* case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, U.S. 327, 65 USPQ 297 (1945).



For claim 21, '822 and '074 disclose the claimed invention except for multiple valves. It would have been an obvious matter of design choice to duplicate multiple valves for maintenance, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8.

**4. Claims 3-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over '822 and '074, further in view of Okutani (US 5135608, hereafter '608).**

'822 and '074, together, teach all limitations of claim 2, as discussed above. '074 further teaches the limitations of:

Claim 3: The system of claim 2, wherein the carrier gas inflow pipe is installed under a state of being soaked in the processing solution stored in the reservoir (as shown in Fig. 10).

'822 and '074, together, do not teach the limitations of:

Claim 3: (Gas inflow pipe) has a plurality of discharge holes for forming processing solution foam by the carrier gas discharged from the inflow pipe.

Claim 4: The system of claim 3, wherein an end portion of the carrier gas inflow pipe has a ring shape where the plurality of discharge holes are formed.

'608 is an analogous art in the field of CVD (col. 1, line 38; similar to '822, field of the invention), particularly in supplying precursor (col. 12, line 44; similar to '822 precursor liquid droplet, col. 9, lines 55-57). '608 teaches the use of gas inflow pipe (Fig. 33, #678) with a plurality of discharge holes (as shown in Fig. 33).

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to have added a plurality of discharge holes, as taught by '608, to the N<sub>2</sub> carrier gas inflow pipe to the apparatus in Fig. 10 of '074 (and then combined with '822).

The motivation to add a plurality of discharge holes is to increase bubbling rate and suitability. The selection of something based on its known suitability for its intended use has been held to support a *prima facie* case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, U.S. 327, 65 USPQ 297 (1945).

For claim 3, '822 and '074 discloses the claimed invention except for multiple discharge holes. It would have been an obvious matter of design choice to duplicate discharge holes, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8.

For claim 4, '822, '074, and '608 disclose the claimed invention except for the ring shaped end portion of the inflow pipe. It would have been an obvious matter of design choice to change the end portion of the inflow pipe to ring shape, since such a modification would have involved a mere change in the shape of a component. A change of shape is generally recognized as being within the ordinary level of skill in the art. *In re Dailey*, 357 F.2<sup>nd</sup> 669, 149 USPQ 1966.

**5. Claims 6, 10-13 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over '822 and '074, further in view of Loan et al. (US 6136725, hereafter '725).**

'822 and '074, together, teach all limitations of claim 2, as discussed above. '822 further teaches the limitation of:

Claim 13: The system of claim 2, wherein the reservoir is further provided with a temperature control device for controlling temperature of stored processing solution (#108 with heater and temperature sensor, col. 8, lines 13-14).

'822 and '074, together, do not teach the limitations of:

Claim 6: The system of claim 2, wherein the carrier gas inflow pipe is provided with a gas amount controller for controlling amount of carrier gas.

Claim 10: The system of claim 2, wherein the carrier gas inflow pipe is further provided with a separation pipe connected to the reaction chamber in order to introduce the carrier gas into the reaction chamber.

Claim 11: The system of claim 2, wherein the supply pipe is further provided with a gas amount controller for controlling amount of the carrier gas including liquid drops of the processing solution.

Claim 12: The system of claim 11, wherein a pair of valves for controlling flow of the carrier gas are installed at the supply pipe up and down on the basis of the gas amount controller.

Claim 15: The system of claim 2, wherein the supply pipe is further provided with a heater for increasing temperature of the carrier gas including liquid drops of the processing solution.

'725 is an analogous art in the field of CVD (col. 2, line 37; similar to '822, field of the invention), particularly in solving problem of liquid precursor delivery (col. 1, line 58 to col. 2 line 4; similar to '822 precursor liquid droplet, col. 9, lines 55-57). '725 teaches a MFC/gas amount controller (Figs. 1A-B, #166, col. 16, lines 59-60) for controlling the amount of carrier gas (#154, He, col. 7, line 64); a separation pipe (the line near valve #157 that goes up and right to the upstream section #78 of the reaction chamber) to the reaction chamber; the supply pipe (from vaporizer #26 to #78) provided with a gas amount controller (#14, col. 6, line 34 to col. 7, line 8); a pair of valves (#42, col. 7, line 49 and #58, col. 7, line 57) up and down the gas amount controller (#14); and heater for the supply pipe (col. 3, lines 20-21).

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to have added the liquid precursor delivery system, as taught by '725, to the apparatus in Fig. 5 of '822.

The motivation to add the liquid precursor delivery system is to delivery low vapor pressure precursor, as taught by '725, (col. 2, lines 33-41).

**6. Claims 5 and 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over '822, '074, and '608, further in view of '725.**

'822, '074, and '608, together, teach the limitations of claim 3, as discussed above.

'822, '074, and '608, together, do not teach the limitations of:

Claim 5: The system of claim 3, wherein the carrier gas inflow pipe is provided with a gas amount controller for controlling amount of carrier gas.

Claim 7: The system of claim 3, wherein the carrier gas inflow pipe is further provided with a separation pipe connected to the reaction chamber in order to introduce the carrier gas into the reaction chamber.

Claim 8: The system of claim 7, wherein gas flow control valves are respectively installed at the separation pipe and between a connection spot of the inflow pipe and the separation pipe and the reservoir.

Claim 9: The system of claim 7, wherein the separation pipe is connected to the supply pipe.

'725 is an analogous art and teaches the limitations of claim 5 and 7 as discussed above. '725 further teaches gas flow control valve (#157, col. 8, lines 4-5) at the separation pipe and valve (#160, col. 8, line 6) between a connection spot of the inflow pipe and the separation pipe (intersection point below #157 and to the right of #160) and the reservoir (#200). For substantially the same reason of *Graham v. Deere* analysis, claims 5 and 7-9 are rejected.

**7. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over '822, '074, and '725, further in view of Takada (JP 06-254416, hereafter '416).**

'822, '074, and '725, together, teach the limitations of claim 13, as discussed above. '822 (so does '725) further teaches the limitations of:

Claim 14: The system of claim 13, wherein the temperature control device comprises: a receiving tank (#108) for receiving the reservoir (#102); a heater installed in the receiving tank and for generating heat (as seen in Fig. 5).

'822, '074, and '725, together, do not teach the limitations of:

Claim 14: (a receiving tank) in which insulating oil is filled; and a cooling device installed in the receiving tank and for absorbing heat.

'416 is an analogous art in the field of vapor generation (English abstract, Purpose; similar to '822 precursor liquid droplet, col. 9, lines 55-57). '416 teaches an oil bath (Fig. 1, #8) and cooling pipe (#6), in addition to heater (#18), for the generation of vapor.

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to have added an oil bath and cooling coil/device, as taught by '7416, to the apparatus in Fig. 5 of '822.

The motivation to add an oil bath and cooling coil/device is to delivery high vapor content/humidity precursor, as taught by '416, (Constitution).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Keath T. Chen whose telephone number is 571-270-1870. The examiner can normally be reached on M-F, 8:30-5:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Cleveland can be reached on 571-272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/K. T. C./  
Examiner, Art Unit 1792

/Ram N Kackar/  
Primary Examiner, Art Unit 1792